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What is the best age to enter the labor market in Brazil today?

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Abstract

This study is an attempt to measure the effects of entering the Brazilian labor market at an early age on wages earned as an adult. In a previous study using a pooled data cross section (1988 and 1996), the conclusion was reached that the effect of entering the labor market at an early age is negative for those who begin to work early in life, but it becomes positive for those who start working between the age of 12 and 14. We used a pooled data cross section (2001-2009 and 2011) and found evidence that this age is much higher today, meaning that earnings continue to grow as people enter the labor market after the age of 14. We also found a threshold effect in returns to education with a magnitude that increases as people enter the labor market at older ages.

JEL classification: J22; J31; O12

Keywords: Child labor; Earnings; Education

Resumo

Este estudo é uma tentativa de medir os efeitos da entrada precoce no mercado de trabalho brasileiro nos salários na fase adulta da vida. Um estudo anterior feito com dados empilhados (1988 e 1996) concluiu que o efeito da idade de ingresso no mercado de trabalho é negativo para quem começa a trabalhar muito cedo, mas torna-se positivo para quem começa a trabalhar com idade entre 12 e 14 anos. Usamos dados empilhados (2001-2009 e 2011) e encontramos evidências de que atualmente essa idade é bem maior, ou seja, que os rendimentos continuam a crescer com a postergação do ingresso no mercado de trabalho além dos 14 anos. Encontramos também um efeito limiar nos retornos em escolaridade, cuja magnitude cresce à medida que a entrada no mercado de trabalho é postergada.

Palavras chave: Trabalho infantil; Rendimentos; Educação

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1. Introduction

It is plausible that working at an early age has a strong negative impact on future individual earnings and, consequently, on national income. This hypothesis seems to be widely accepted by academics and policymakers. However, there is little empirical evidence supporting it. There is extensive literature on the causes of child labor. However, according to Kassouf (2007) and Emerson and Souza (2011), only a few studies have been carried out on its hazards. According to the literature, the main ones are on its negative impacts on health (see Kassouf et al., 2001; Odonnell et al., 2004) and education (see Heady, 2003), both of which are determinants of human capital and have a positive effect on labor earnings in adult life (henceforth earnings).

Taking the Yoram (1967) model seriously, both level of schooling and entry age in the labor market are endogenously and simultaneously decided. In order to claim causality from child labor to adult earnings, some treatment must be applied. Unfortunately, relevant and valid instrumental variables in order to control for the potential endogeneity of the level of schooling and age started to work in the earnings equations are seldom available in the databases commonly used in empirical studies of the consequences of child labor.

Emerson and Souza (2011) estimated a model using instrumental variables to obtain more robust estimates than those previously obtained by Emerson and Souza (2003) and Ilahi et al. (2001). It should be noted that a set of instrumental variables that do not vary among individuals, only among Brazilian states, were used. Moreover, since information about the age at which the individuals started to work and about their family background is available only for heads of families or spouses, the sample used by the authors excludes all other individuals with a different status in the family. In sum, due to the specificities of the data set used by the authors to build the instruments used in the estimations, it is hardly possible to apply the same kind of econometric modeling to come up with more evidences about the harms of child labor today.

In sum, Emerson and Souza (2011) concluded that child labor is associated with lower adult earnings. Specifically, they observed a quadratic relationship between the age at which an individual started working and his or her earnings in adult life. The impact of entering the labor market is negative for young children (in the sample used) and that negative effects turn positive between 12 and 14 years old. Although a plausible explanation was given by the authors for the maximum point of earnings and the age at which one began to work, in our opinion the estimated maximum point is significantly low even taking into account that child labor occurred several decades before. The authors suggest that the results found may be relevant to other countries with economies structurally similar to the Brazilian one in the 1950s, 1960s, and 1970s. They also claim that in Brazil today it might be better to delay the age at which one starts to work, considering that the environment changed quite significantly. In this context, an important social and economic question emerges: what is the best age to enter the Brazilian labor market today?

Our study is a attempt to measure the negative effects of child labor on earnings in adult life for individuals who, regardless of having worked as a child or not, managed to complete the two most important levels of education: high school and university. For this we select two restricted samples. One is a sample of individuals aged 23–65 years old with high school education completed only. Another is a sample of 23–65 year old individuals with higher education only. Clearly, conditioning in one (endogenous) variable and running a regression of the other variable on earnings does not solve the endogeneity problem.

The central idea of using two restricted samples is that, regardless of any difficulties caused by working as a child or youth, all the individuals included in the samples managed to complete at least one or two levels of education, as other individuals with the same level of schooling who did not work at an early age did. Our expectation is that individuals with the same level of schooling will have, on average, different earnings according to the age at which they entered the labor market. Among other reasons, this is a result of differences in the quality of their education and shortcomings in the learning process of those who, for instance, had to work during the day and study in the evening or vice versa. However, both aspects are reflected on the type of work one does as an adult.

We found evidence suggesting that not controlling for the number of hours worked might yield a downward bias in the estimate of the maximum point for the age at which one started to work. We found that the effect of the age at which one begins to work on labor income remains negative much beyond the age of 14 found by Emerson and Souza (2011). This issue and others will be discussed in greater detail in Section 4.

We also found evidence that, for people with the same level of schooling, the age at which they got their first job had an effect on their earnings. At this point, another question emerges: are the returns to education for adults equal for those who started working at different ages? As an attempt to find evidence in support of an appropriate answer

to this question, earnings equations were estimated with different samples, according to the age interval in which people got their first job. So, this study also investigated whether the returns to education vary according to the age at which an individual started working. This issue has not been investigated in the Brazilian labor market so far. We also investigated if education has a threshold effect after taking into account the age at which one starts to work. Our findings also are unprecedented.

This paper is structured as follows. Section 2 presents a brief description of the data and samples utilized. Section 3 describes the methodological procedures – empirical models and estimator. Results are discussed in Section 4. Section 5 concludes the study.

2. Data and samples

Earnings are rising in Brazil in recent years. We therefore opted for using pooled sample data covering a period marked by significant changes in the Brazilian labor market. The data set used in the estimations is made up of samples of the 2001–2009 and 2011 National Household Sample Survey (pooled cross-section) defined by the Brazilian Institute for Geography and Statistics (IBGE in Brazilian acronym).

In order to avoid current labor market participation selection bias problem and capture more accurately the impact of working earlier in life on adult earnings, the sample was restricted to workers aged 23–65 years old. We also excluded individuals with ill-defined occupations, and who were still studying or who worked but had no earnings, as well as observations with missings in any of the variables.

After applying the above-mentioned filters to the sample, we divided it into four sub-samples: (i) women with full secondary education, (ii) men with full secondary education, (iii) women with higher education, and (iv) men with higher education.[1]

Table 1 provides the proportion of individuals based on historical information about the age at which they started working in each of the nine years analysed here.

3. Empirical modeling

The model specification is a variant of the classical earnings equations in which the dependent variable is the natural logarithm of earnings (in Brazilian Reals in 2001) from the main job divided by the number of hours per week worked in this occupation.

Heckman's procedure (by maximum likelihood) was used to correct the sample selectivity bias in the earnings equations. Sample expansion factors associated to each observation were used and the characteristics of the sampling, designated as complex surveys, were taken into account. The sampling plan applied to the surveys is stratified and clustered and uses unequal selection probabilities. Ignoring the sample design may underestimates the actual variance. The Taylor series linearization method was used to provide correct standard errors.[2]

In the basic model, the *explanatory variable* of interest is the age at which individuals started working. This is done in two ways: (ii) model A – using a dummy variable that assumes value 1 if the individual began working before the age of 16 (15 or less) and 0 if that was not the case (`Child labor`); and (ii) model B – using a set of dummy variables to distinguish between age intervals at which the individuals entered the labor market (`Age started to work`, where for high school, the base age group is 17 years old and over, and for higher education, the base age is 23 years old and over).

In the *earnings equation* the other control variables are: (a) age of the individual (`Age`) in years and the square of this variable (`Age squared`); (b) a dummy variable for the individual's genders, which is 1 for males and 0 for females (`Man`); (c) four dummy variables to distinguish between five skin colors – `White` (base group), `Black`, `Mulatto`, `Yellow` (Asian) and `Indigenous` people; (d) a dummy variable for residence location, which is 1 when the individual resides in an urban area and 0 if he or she resides in a rural area (`Urban area`); (e) a dummy variable for association to a labor union membership, which is 1 if the individual is member and 0 if not (`Labor`

[1] Individuals with a master's or doctor's degree were not included in the samples defined for higher education and college graduates were not included in the samples defined for secondary education.

[2] Skinner et al. (1998), Pessoa and Silva (1998), and Silva et al. (2002) who give an introduction about complex surveys.

Table 1
Proportion of Brazilian individuals by the age at which they started to work, gender, and survey.

	Age started to work	Years									
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2011
Woman	9 or less	12.28	12.37	11.93	11.23	11.32	10.75	8.93	10.12	8.93	7.55
	10	8.53	8.63	8.58	8.36	7.96	7.84	7.20	6.85	6.42	5.60
	11	3.00	2.87	2.89	3.05	2.63	2.81	2.80	2.66	2.74	2.31
	12	8.88	9.03	9.17	8.60	8.55	8.46	8.87	8.49	8.09	7.26
	13	6.22	6.09	6.07	6.23	6.18	5.95	5.91	5.99	5.65	5.30
	14	9.00	9.12	9.01	9.38	9.49	9.32	9.51	9.17	9.31	9.14
	15	9.73	9.89	9.66	9.85	9.98	10.08	10.12	10.04	10.29	10.03
	16	7.27	7.25	7.64	7.83	7.84	7.82	8.47	8.48	8.74	9.47
	17	6.01	5.86	6.17	6.36	6.40	6.52	6.69	7.01	7.12	7.66
	18	9.76	9.89	9.67	10.02	10.30	10.50	10.86	11.06	12.41	14.17
	19	3.50	3.58	3.66	3.54	3.64	3.64	3.75	3.63	3.98	4.40
	20	4.56	4.67	4.78	4.66	4.60	4.86	4.73	4.83	4.81	5.23
	21	1.77	1.60	1.87	1.96	1.80	1.81	1.85	1.81	1.91	1.95
	22	2.00	2.07	1.95	1.92	2.06	2.05	2.18	2.31	2.26	2.24
	23	1.48	1.52	1.47	1.46	1.51	1.58	1.47	1.56	1.48	1.59
	24	1.13	1.12	1.00	1.09	1.15	1.22	1.16	1.31	1.28	1.28
	25	1.29	1.09	1.16	1.14	1.15	1.21	1.13	1.18	1.23	1.28
	26	0.50	0.47	0.48	0.51	0.52	0.59	0.56	0.51	0.50	0.61
	27	0.38	0.33	0.37	0.37	0.31	0.38	0.37	0.47	0.39	0.42
	28	0.35	0.38	0.37	0.30	0.37	0.39	0.31	0.42	0.41	0.41
	29	0.23	0.21	0.24	0.21	0.22	0.22	0.23	0.21	0.23	0.26
	30 or more	2.11	1.97	1.87	1.94	2.02	2.01	2.89	1.90	1.83	1.84
Man	9 or less	19.46	18.66	17.95	17.04	16.73	16.04	14.16	14.56	13.68	11.59
	10	12.99	12.68	12.77	12.69	12.20	11.45	11.05	10.40	10.09	8.78
	11	3.52	3.26	3.27	3.27	3.19	3.23	3.28	3.24	3.12	2.73
	12	12.40	12.10	11.63	11.86	11.79	11.24	11.95	11.65	11.25	10.20
	13	6.61	6.70	6.73	6.68	6.65	6.54	6.58	6.58	6.49	6.06
	14	11.14	11.56	11.69	11.97	11.90	11.62	11.48	11.54	11.41	11.86
	15	9.07	9.22	9.53	9.45	9.58	9.96	10.04	10.30	10.52	11.04
	16	6.58	6.85	7.07	7.28	7.34	7.93	7.87	8.61	8.86	9.77
	17	4.45	4.62	4.65	4.94	5.10	5.34	5.40	5.81	5.84	6.98
	18	6.55	7.16	7.14	7.27	7.67	8.11	8.27	8.47	9.49	11.36
	19	2.02	2.02	2.03	2.15	2.06	2.30	2.43	2.44	2.64	2.87
	20	2.08	2.11	2.27	2.11	2.39	2.56	2.33	2.53	2.57	2.79
	21	0.75	0.79	0.84	0.85	0.80	0.90	0.91	0.99	0.95	0.90
	22	0.75	0.78	0.79	0.84	0.83	0.97	0.92	0.95	1.01	0.98
	23	0.52	0.50	0.52	0.54	0.56	0.59	0.62	0.58	0.58	0.61
	24	0.35	0.34	0.36	0.37	0.45	0.43	0.42	0.47	0.54	0.52
	25	0.34	0.29	0.37	0.28	0.37	0.39	0.36	0.42	0.43	0.44
	26	0.13	0.12	0.12	0.15	0.15	0.16	0.16	0.14	0.19	0.16
	27	0.08	0.10	0.08	0.07	0.08	0.08	0.09	0.10	0.09	0.11
	28	0.08	0.05	0.06	0.07	0.06	0.06	0.06	0.08	0.08	0.09
	29	0.04	0.02	0.02	0.02	0.03	0.02	0.02	0.04	0.04	0.05
	30 or more	0.08	0.08	0.11	0.08	0.07	0.08	1.60	0.09	0.12	0.11

Notes: Data from the full sample (i.e. without excluding any observation).

`union`); (f) five dummy variables to control for possible regional differences: North, South, Mid-West, Northeast, and Southeast (base group); (g) nine dummy variables for year, to control for possible fixed time effects (2001 as the base group).

The *participation equation* contains all regressors cited above, except the labor union membership and age at which he or she began to work because both are only defined in the database if the person worked. We also included other personal and family characteristics: (a) a dummy variable for existence of some non-labor income (e.g., conditional cash transfer programmes), which is 1 if the individual receives and 0 if not; (b) a dummy variable for marital status,

Table 2
Percentage marginal effects of the age intervals at which one started working on earnings, by level of education.

Age at which started working	High school (the base age group is 17 years old and over)		Higher education (the base age group is 23 years old and over)	
	Woman	Man	Woman	Man
		Model A		
15 or less	−12.14*	−7.46*	−19.31*	−20.89*
	(−12.85; −11.42)	(−8.19; −6.73)	(−20.52; −18.08)	(−22.24; −19.52)
		Model B		
8 or less	−23.81*	−17.24*	−39.99*	−43.72*
	(−25.41; −22.17)	(−18.65; −15.80)	(−42.18; −36.95)	(−46.48; −40.81)
9–10	−22.05*	−14.91*	−36.77*	−39.79*
	(−23.37; −20.71)	(−16.13; −13.66)	(−39.19; −34.25)	(−42.45; −37.02)
11–12	−15.88*	−8.76*	−32.54*	−33.07*
	(−17.07; −14.68)	(−9.91; −7.59)	(−34.81; −30.20)	(−35.63; −30.42)
13–14	−7.72*	−2.54*	−23.4*	−26.42*
	(−8.75; −6.68)	(−3.57; −1.50)	(−25.44; −21.29)	(−28.64; −24.14)
15–16	−4.48*	−3.25*	−20.74*	−24.18*
	(−5.40; −3.55)	(−4.19; −2.30)	(−22.55; −18.88)	(−26.43; −21.87)
17–18			−14.7*	−16.36*
			(−16.45; −12.91)	(−18.66; −14.00)
19–20			−9.84*	−10.29*
			(−11.88; −7.75)	(−13.11; −7.39)
21–22			−2.05***	−1.17
			(−4.43; −0.39)	(−4.74; −2.54)

Notes: The results of the estimations are shown in Table A.1. For high school, the base age group (omitted variable) is 17 years old and over. For higher education, the base age is 23 years old and over; * and *** refer to significance at 1% and 10% (Delta-method standard errors were used), respectively; 95% confidence interval in parentheses.

which is 1 if the individual is married and 0 if he or she is not; (c) a dummy variable for children living in the same household, which is 1 if there is and 0 if not; (d) a dummy variable for position in the family, which is 1 if the individual is the head of the household and 0 if he or she assumes other positions in the family.

4. Results and discussions

In reading the results, one must consider that, unfortunately, it is not possible to distinguish jobs outside the home from work at home or in other family activities, to distinguish work during school breaks or on weekends from work during school hours, and to distinguish continuous employment from occasional or seasonal employment. The number of hours worked by an individual as a child is not known. It is only possible to know the age at which the individual started working. One should remember that the information about the first job age is related to the past of workers aged 23–63 years old.

Table 2 shows estimates of marginal effects in percentage, by gender and level of schooling group. The value are the effect of the age at which Brazilians in the 23–65 age intervals began to work on earnings. Table A.1 shows the results of earnings equations estimated.[3]

As for the other control variables, the results are similar to the ones usually observed in studies on earnings determinants in the Brazilian labor market.

The results of model A indicate that those who start working at the age of 15 or less have lower earnings than those who only do so after completing 16 years of age. But there is a difference in the magnitude of the harm of working at an early age between the two genders and according to the level of schooling. For people who only completed high school, the harm is estimated at approximately 12.1% and 7.5% for women and men, respectively. For people who completed higher education, however, the harm for both genders is far greater than that suffered by those who only

[3] The selection equation estimates are available upon request.

completed secondary education (19.3% and 20.9% for women and men, respectively). Moreover, there is an inversion so that the estimated negative effects on earnings are about 1.6 percentage points higher for men than for women.

The estimation results of model B corroborate the results of the first model, namely, that child labor reduces future earnings. However, it is once again observed that the harm is greater for people who manage to complete at least higher education. It is clearly observed that the negative effects of the age at which a person started working on his or her future earnings decrease according to when that person got his or her first job. For the group of people who only completed high school, it is estimated that the earnings of those who started working before completing 9 years of age (8 or less) as compared to those who entered the labor market after completing 17 years is about 23.8% and 17.2% lower for women and men, respectively. For people who began to work before the age of 9 and completed higher education, it is estimated that the reduction in earnings is approximately 40.0% and 43.7% for women and men, respectively.

It should be observed that both for high school and higher education, the negative effect on earnings in adult life decreases as the individuals enter the labor market later in their life and closer to the average age at which they graduated at either of those levels. For instance, for a man who began to work before the age of 9 and only completed high school, the estimated reduction in earnings is 17.2%, but it drops to 3.2% if he entered the labor market after the age of 15. For men who completed higher education, this reduction in earnings drops from 43.7% for those who started working at the age of 8 or less to zero (statistically null) if they started their first job at the age of 21.

Since the sample used in the estimations is composed by individuals with the same level of schooling, regardless of the age at which they began to work, the results indirectly reflect the quality of their learning, the lower learning ability of those who both worked and studied and, consequently, the type of job they had as adults.

At this point, another question emerges: are the returns to education for adults equal for people who started working at different ages? We estimated the same earning equations using different samples, according to the age intervals in which people got their first job in order to answer this question.

Since the sample was not restricted to specific schooling-based groups, but rather to groups based on the age at which a person began to work, education was initially measured alternatively in the light of two aspects: (a) years of schooling (S), ranging from 0 for no schooling or less than one year of schooling to 15 for those with 15 years of schooling or more; (b) 15 dummy variables to distinguish 16 years of schooling, based on people without any schooling or who had only studied for less than one year.

It is important to point out that since the estimation were based on sample data for groups defined by the age intervals in which they got their first job, the age and age-squared variable are direct controls for work experience that are usually measured by the proxy defined by the difference between the actual age of the person and that at which he or she started working.

The results obtained with the second way of measuring education are show in Tables A.2 and A.3. The returns to education are positive, suggesting that increases in earnings are substantially higher from 10 years of schooling for both genders.[4] It should be noted that the first year of schooling yielding the highest return is the 11th grade, the last grade of high school. We also observed that the threshold effect (from 10 years of schooling) of education increases with the age at which one started to work. This is new evidence suggesting the negative effects of early work.

Therefore, we considered the existence of a threshold effect, besides the `years of schooling` variable, and included the variable $S^{\lambda} = Z(S - \lambda)$ in the specification, where λ is the threshold, i.e. the value of schooling from which the return on education increases, and Z is a dummy variable that assumes value 0 for $S \leq \lambda$ and value 1 for $S > \lambda$. Using the variable $S^{\lambda} = Z(S - 10)$ in the specification, the results were observed on earnings for each additional year of education from 10 years of schooling.

Table 3 shows the percentage marginal effects of years of schooling and the threshold effect (from 10 years of schooling) on earnings, by the age intervals in which one began to work. For both men and women, the percentage increase in earnings for each additional year of education after 10 years of schooling increases as the age at which they entered the labor market increases. This is an indirect evidence that the negative effects of working at an early age on future earnings are caused, among other reasons, by the quality of the education received. This has both a direct and an indirect effect on the kind of work obtained. For men, for example, an additional year of education from 10 years of schooling yields a return of 26.7% for those who start working after the age of 23, while the return for those who

[4] Evidence of the threshold effect of education as from 10 years of schooling was found by Hoffmann and Sim ao (2005) for the state of Minas Gerais, Brazil.

Table 3
Percentage marginal effects of years of schooling and threshold effect (from 10 years of schooling) on earnings, by the age intervals at which one started working.

Age at which started working	Woman		Man	
	Years of schooling	Threshold effect	Years of schooling	Threshold effect
8 or less	5.26	9.61	6.82	12.36
	(4.89; 5.64)	(8.48; 10.76)	(6.59; 7.05)	(10.98; 13.76)
9–10	5.31	10.64	6.85	13.27
	(4.99; 5.64)	(9.65; 11.64)	(6.64;7.07)	(12.16; 14.39)
11–12	5.12	11.78	6.85	13.16
	(4.83; 5.42)	(10.93; 12.64)	(6.65; 7.06)	(12.18; 14.15)
13–14	4.91	13.75	6.46	15.93
	(4.67; 5.16)	(13.09; 14.40)	(6.27; 6.64)	(15.20; 16.66)
15–16	5.61	15.04	6.22	15.82
	(5.36; 5.85)	(14.37; 15.72)	(6.03; 6.42)	(15.20; 16.45)
17–18	6.03	18.99	5.52	16.88
	(5.72; 6.33)	(18.29; 19.69)	(5.30; 5.75)	(16.03; 17.33)
19–20	6.01	21.25	5.37	18.79
	(5.59; 6.43)	(20.18; 22.33)	(4.96; 5.78)	(17.89; 19.70)
21–22	5.45	24.52	4.88	22.13
	(4.76; 6.16)	(22.88; 26.18)	(4.15; 5.61)	(20.77; 23.50)
23 or more	3.65	28.04	4.79	26.73
	(3.24; 4.06)	(26.23; 29.89)	(4.02; 5.57)	(25.71; 27.77)

Notes: All marginal effects are statistically significant at 1% (Delta-method standard errors were used); 95% confidence interval in parentheses; The results of the estimations are shown in Tables A.2 and A.3.

have to work before reaching the age of 9 is 12.4%. It should be noted that, for both genders, the positive threshold effect on earnings increases steadily as people enter the labor market at a later age.

We recognize that our findings are not convincing that endogeneity issues were solved by simply restricting the sample to those who ultimately complete high-school or post-secondary education. Nonetheless, we believe that child labor reduces earnings in adult life after applying estimations conditional on the years of schooling completed by the individuals. The results presented in Table 4 reinforce those obtained at using the samples restricted to maximum level of education achieved. Since schooling is the same for all observations in each of the 16 samples used in the estimation (0–15 years of schooling), the endogeneity between the age at which an individual began to work and his/her education is no longer a relevant problem, as it is much less likely to occur.

One would believe that even after performing separate estimations for years of schooling, the difference in earnings in adult life is due to negative effects on the learning of children or youths who studied and also worked during part of the day. This does not hold when we look at the effect estimated for people with zero years of schooling, i.e. with no schooling. Even in this group, we found evidence that child labor has a negative effect on earnings in adult life.

According to Emerson and Souza (2011) the impact of entering the labor market is negative for young children (in the sample used) and that negative effects turn positive between the ages of 12 and 14. Specifically, a concave down parabola was observed that assumes a maximum value at the age of 13–14. In our opinion, even taking into account that child labor occurred several years before, this age is very low. It is important to consider that no control was applied to the number of hours worked in the main job. In this regard, it is interesting to observe, in Fig. 1, the averages of the logarithm of earnings and number of hours worked per week in main job according to the age at which one started to work (7–25 years old) for Brazilian males aged from 25 to 55 years old.[5] This figure shows that the number of hours worked per week decreases as the age at which an individual enters the labor market increases. In the earnings equation, one can clearly see that controlling for the number of hours worked by an individual today (i.e. in his or her adult life) is key, especially if the objective is that of isolating the effect of working at an early age in the past. However, this figure may lead one to think that it depicts an unreal situation, due to differences in the number of individuals in each first job age group. Indeed, the proportion of children who start working before the age of 14 today is relatively

[5] The same survey years used by the authors were applied here to build the figure.

Table 4
Earnings equations (models A and B) using Heckman's procedure for Brazilian individuals aged from 23 to 65 years old, by years of schooling.

Variables	Years of schooling							
	0	1	2	3	4	5	6	7
Constant	0.345*	0.160***	0.290*	0.144*	0.102*	0.0988**	0.0725	−0.00192
	(0.0489)	(0.0882)	(0.0662)	(0.0538)	(0.0372)	(0.0444)	(0.0601)	(0.0577)
Age	0.0203*	0.0248*	0.0205*	0.0265*	0.0297*	0.0338*	0.0397*	0.0427*
	(0.00203)	(0.00381)	(0.00295)	(0.00245)	(0.00170)	(0.00218)	(0.00308)	(0.00294)
Age squared	−0.000224*	−0.000235*	−0.000171*	−0.000236*	−0.000238*	−0.000300*	−0.000368*	−0.000394*
	(0.0000231)	(0.0000441)	(0.0000343)	(0.0000289)	(0.0000201)	(0.0000270)	(0.0000400)	(0.0000383)
Man	0.191*	0.213*	0.207*	0.243*	0.283*	0.296*	0.313*	0.319*
	(0.00913)	(0.0139)	(0.0101)	(0.00793)	(0.00477)	(0.00580)	(0.00750)	(0.00729)
Mulatto	−0.00720	0.0821	−0.0709	−0.0935	−0.0758**	−0.0754	−0.121**	−0.0486
	(0.0511)	(0.109)	(0.0778)	(0.0676)	(0.0385)	(0.0566)	(0.0594)	(0.0589)
Black	−0.0925*	−0.0899*	−0.0924*	−0.0998*	−0.124*	−0.101*	−0.104*	−0.111*
	(0.00705)	(0.0125)	(0.00899)	(0.00746)	(0.00496)	(0.00597)	(0.00800)	(0.00763)
Yellow	−0.0102	0.113	−0.0127	0.0251	0.181*	−0.00823	0.183**	−0.0170
	(0.0772)	(0.197)	(0.124)	(0.0744)	(0.0531)	(0.0624)	(0.0827)	(0.0853)
Indigenous	−0.0887*	−0.0617*	−0.0741*	−0.0983*	−0.129*	−0.105*	−0.129*	−0.128*
	(0.0108)	(0.0192)	(0.0137)	(0.0112)	(0.00792)	(0.00982)	(0.0123)	(0.0122)
Urban area	0.303*	0.307*	0.285*	0.294*	0.279*	0.235*	0.205*	0.221*
	(0.00923)	(0.0145)	(0.0113)	(0.0104)	(0.00838)	(0.0100)	(0.0135)	(0.0138)
Labor union	−0.00141	0.0434**	0.0303**	0.0577*	0.124*	0.116*	0.131*	0.156*
	(0.0101)	(0.0173)	(0.0139)	(0.0108)	(0.00711)	(0.00842)	(0.0104)	(0.00988)
Child labor	−0.178*	−0.137*	−0.118*	−0.102*	−0.0775*	−0.0394*	−0.0322*	−0.0305*
	(0.00844)	(0.0149)	(0.0104)	(0.00862)	(0.00544)	(0.00614)	(0.00765)	(0.00728)
ath $\hat{\rho}$	−0.427*	−0.425*	−0.392*	−0.313*	−0.258*	−0.235*	−0.222*	−0.208*
	(0.0333)	(0.0479)	(0.0429)	(0.0291)	(0.0165)	(0.0184)	(0.0243)	(0.0186)
Number of obs.	109,471	27,074	44,615	62,437	141,002	89,532	49,495	52,031
	8	9	10	11	12	13	14	15
Constant	0.204*	0.0384	−0.132***	0.162*	0.550*	0.296***	0.480*	0.841*
	(0.0356)	(0.0750)	(0.0764)	(0.0259)	(0.123)	(0.160)	(0.122)	(0.0520)
Age	0.0384*	0.0535*	0.0611*	0.0553*	0.0429*	0.0642*	0.0679*	0.0540*
	(0.00174)	(0.00375)	(0.00398)	(0.00129)	(0.00615)	(0.00750)	(0.00565)	(0.00242)
Age squared	−0.000332*	−0.000517*	−0.000595*	−0.000459*	−0.000354*	−0.000582*	−0.000639*	−0.000423*
	(0.0000219)	(0.0000490)	(0.0000528)	(0.0000171)	(0.0000791)	(0.0000971)	(0.0000705)	(0.0000303)
Man	0.324*	0.315*	0.346*	0.326*	0.415*	0.323*	0.335*	0.364*
	(0.00438)	(0.00952)	(0.00919)	(0.00284)	(0.0155)	(0.0169)	(0.0146)	(0.00515)
Mulatto	−0.106*	−0.227**	−0.101	−0.135*	−0.0970	−0.182	−0.354***	−0.141**
	(0.0376)	(0.0911)	(0.0703)	(0.0330)	(0.143)	(0.118)	(0.183)	(0.0585)
Black	−0.133*	−0.116*	−0.134*	−0.150*	−0.228*	−0.177*	−0.131*	−0.231*
	(0.00499)	(0.0105)	(0.00997)	(0.00352)	(0.0188)	(0.0200)	(0.0171)	(0.00759)
Yellow	0.123*	0.415*	0.191**	0.123*	0.138***	−0.0383	0.159**	0.0615**
	(0.0406)	(0.110)	(0.0935)	(0.0259)	(0.0741)	(0.0704)	(0.0724)	(0.0270)
Indigenous	−0.147*	−0.148*	−0.145*	−0.178*	−0.251*	−0.208*	−0.107*	−0.278*
	(0.00766)	(0.0166)	(0.0160)	(0.00552)	(0.0315)	(0.0378)	(0.0327)	(0.0152)
Urban area	0.233*	0.190*	0.211*	0.187*	0.324*	0.297*	0.219*	0.419*
	(0.0112)	(0.0207)	(0.0213)	(0.00994)	(0.0369)	(0.0595)	(0.0390)	(0.0218)
Labor union	0.156*	0.162*	0.166*	0.195*	0.298*	0.236*	0.222*	0.211*
	(0.00573)	(0.0122)	(0.0116)	(0.00371)	(0.0179)	(0.0180)	(0.0143)	(0.00557)
Child labor	−0.0425*	−0.0283*	−0.0291*	−0.0723*	−0.158*	−0.0529*	−0.140*	−0.231*
	(0.00450)	(0.00957)	(0.00950)	(0.00319)	(0.0156)	(0.0179)	(0.0148)	(0.00675)
ath $\hat{\rho}$	−0.174*	−0.205*	−0.158*	−0.199*	−0.235*	−0.271*	−0.219*	−0.269*
	(0.0107)	(0.0230)	(0.0226)	(0.00892)	(0.0459)	(0.0475)	(0.0576)	(0.0232)
Number of obs.	131,859	27,952	30,943	332,814	13,062	10,869	14,121	134,395

Notes: Linearized standard errors in parentheses; Four dummy variables to distinguish between the five Brazilian regions, and nine dummy variables to distinguish 10 years were used; The selection equation estimates are available upon request.

* Significance at 1% respectively.

** Significance at 5% respectively.

*** Significance at 10% respectively.

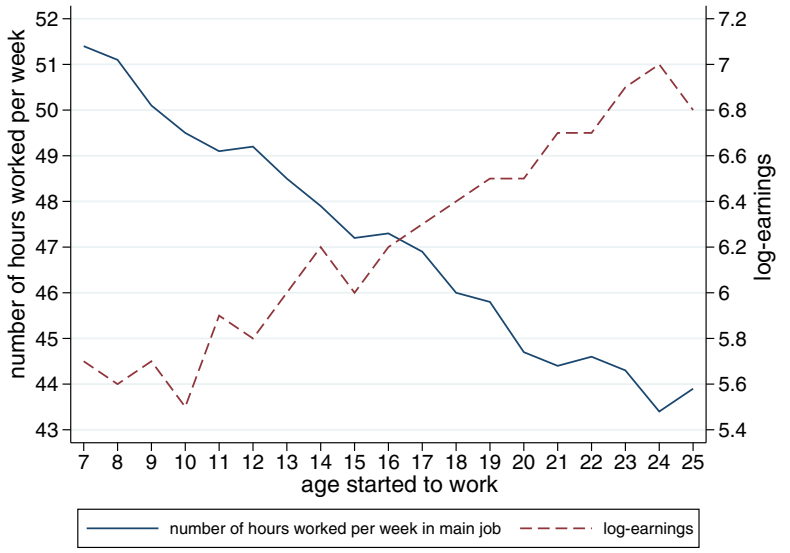

Fig. 1. Averages of the logarithm of earnings and number of hours worked per week in main job according to the age at which an individual started to work, for Brazilian males aged from 25 to 55 years old, 1988 and 1996 (pooled data).

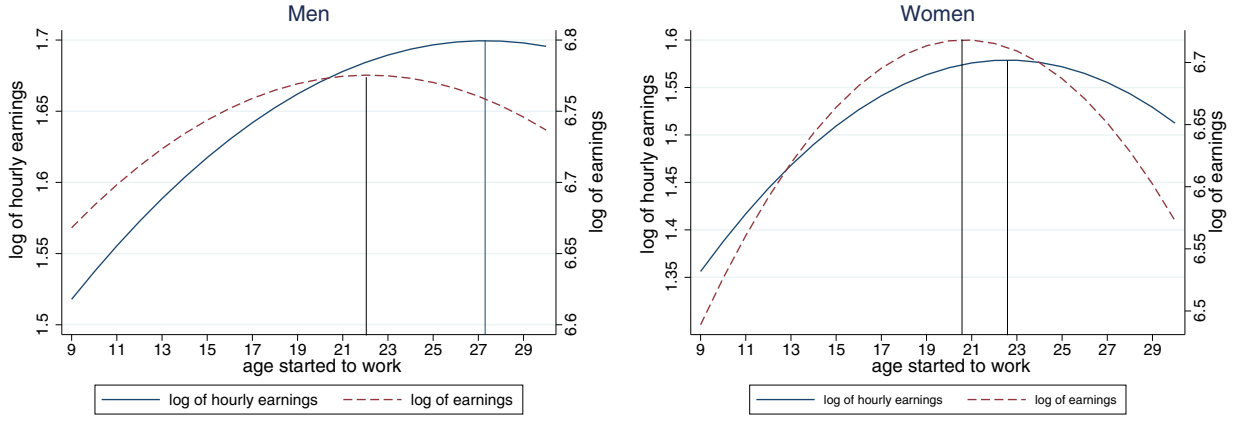

Fig. 2. Estimated relationship between logarithm of earnings and age at which an individual started to work with and without controlling for number of hours worked per week in main job, 1988 and 1996 (pooled data).

small as compared to later age groups. The same can be said for people who start working after they are 25 years old in relation to those who do so at the age of 14–18, for example. One should consider, however, that the information about the first job age is related to the past of individuals who are at least 25 years old. Table 1 shows the proportion of Brazilian individuals by the age at which they started to work, gender, and survey (2001–2009 and 2011). The high rates of men in the 25–55 age intervals who started working before they were 14 years old is not surprising, as child and adolescent labor was common in the past, especially in agriculture.

In this context, we estimated models using the same data sets and model regressors whose results are reported in our Tables A.2 and A.3, but without conditioning according to the age one began to work and using this variable and its square as regressors of the logarithm of hourly earnings and of the logarithm of earnings. Table 5 presents the results of this empirical exercice.[6]

For the models with the logarithm of hourly earnings, we obtained an effect that peaks at around the age of 27 or 22 years old (age at which one started working) for males and females, respectively. Fig. 2 shows the estimated

[6] The selection equation estimates are available upon request.

Table 5
Earnings equation using Heckman's procedure for Brazilian individuals aged from 23 to 65 years old, by gender.

Variables	Log of hourly earnings		Log of earnings	
	Women	Men	Women	Men
Constant	−0.832*	−0.845*	4.283*	4.390*
	(0.0282)	(0.0206)	(0.0268)	(0.0207)
Age	0.0418*	0.0597*	0.0348*	0.0655*
	(0.00105)	(0.000751)	(0.00101)	(0.000747)
Age squared	−0.000356*	−0.000566*	−0.000334*	−0.000650*
	(0.0000127)	(0.00000918)	(0.0000127)	(0.00000908)
Mulatto	−0.0512**	−0.114*	−0.0616*	−0.146*
	(0.0218)	(0.0221)	(0.0238)	(0.0217)
Black	−0.126*	−0.145*	−0.136*	−0.155*
	(0.00299)	(0.00271)	(0.00323)	(0.00274)
Yellow	0.113*	0.103*	0.174*	0.128*
	(0.0209)	(0.0190)	(0.0225)	(0.0183)
Indigenous	−0.125*	−0.165*	−0.121*	−0.178*
	(0.00477)	(0.00408)	(0.00510)	(0.00408)
Schooling	0.0483*	0.0618*	0.0542*	0.0635*
	(0.000677)	(0.000529)	(0.000680)	(0.000528)
S^{λ}	0.165*	0.149*	0.140*	0.125*
	(0.00169)	(0.00189)	(0.00175)	(0.00192)
Urban	0.175*	0.303*	0.293*	0.328*
	(0.00870)	(0.00626)	(0.0108)	(0.00685)
Labor union	0.183*	0.142*	0.247*	0.145*
	(0.00394)	(0.00323)	(0.00420)	(0.00316)
Age started to work	0.0545*	0.0296*	0.0695*	0.0275*
	(0.00130)	(0.00148)	(0.00137)	(0.00148)
Age started to work squared	−0.00121*	−0.000542*	−0.00168*	−0.000622*
	(0.0000361)	(0.0000498)	(0.0000377)	(0.0000492)
Earnings is maximized at age to work	22.6	27.3	20.6	22.1
Number of obs.	519,181	752,491	519,181	752,491

Notes: Linearized standard errors in parentheses; Four dummy variables to distinguish between the five Brazilian regions, and nine dummy variables to distinguish ten years were used; The selection equation estimates are available upon request.
* Significance at 1% respectively.
** Significance at 5% respectively.

relationship between logarithm of earnings and the age at which one starts to work with and without controlling for number of hours worked per week in the main job (keeping the other variables fixed at their mean values).

Even though we have not managed to solve the alleged endogeneity of education and of the age at which one started working, it seems to us that these figures are more consistent with the reality of the Brazilian labor market. We believe so because individuals usually complete their higher education at about this age interval. It is at this stage of one's life that entering the labor market is a must for those who are not working yet, except if they continue to study, for example, in a postgraduate program. The same type of nonlinearity is observed when the logarithm of earnings is used as response variable. But the point estimate of the maximum of the parabola is lower than that obtained when the hours worked per week are considered. The results were 22 and 20 years old for males and females, respectively. For men (which is the gender they considered), the difference between controlling for hours or not is of about 5 years. Once again, it is worth remembering that such information relates to the past of adults and that, in the past, people used to complete their higher education at a later age compared to now. This results suggests that not controlling for the number of hours worked per week might yields downward bias in the estimate of the maximum point for age started to work. The results shown in Table 5 suggest that the effect of the age at which one begins to work on labor earnings remains negative and much beyond the age of 14, as argued by Emerson and Souza (2011).

In the wage equation, more hours worked lead to higher earnings. Thus, the coefficient of the hours worked variable in the population model is positive. Furthermore, there are reasons to believe that the age at which one begins to work and their number of hours worked per week are negatively correlated. Fig. 1 suggests that this association exists: on

average, individuals who begin to work later in life work fewer hours than those who start working at an earlier age. In sum, since the correlation between the age at which one begins to work and number of hours worked per week is negative and the coefficient of the omitted variable is positive, the bias is negative (see Wooldridge, 2003, pp. 91–95).

5. Final remarks

We concluded that working at an early age has a negative effect on one's earnings as an adult, regardless of the gender and schooling level. We also found a threshold effect in returns to education with a magnitude that increases as people enter the labor market at older ages.

Our results cannot be compared to those from Emerson and Souza (2011). There are differences between them that make the comparison difficult, especially because in that study instrumental variables were used in order to control for the potential endogeneity of the aged started to work and schooling variables. Nonetheless, the main conclusion is convergent: there are negative impacts of working earlier in life on adult earnings. In this sense, child labor is harmful! But, an important question emerges: what is the best age to enter the labor market in Brazil?

Using a complex econometric methodology, the previous study concluded that this age is about 14 years old. Our results suggest that the effect of the age at which one starts to work on labor earnings remains negative much beyond this age. We consider that this age is very low even taking into account the years under analysis. Here, we discussed a point that can partially explain why such a low age was estimated.

We recognize that our empirical strategy does not remove all concerns about the sources of endogeneity of having worked as a child in earnings equations. Thus, the robustness of our estimates is also limited. However, the inclusion of the age at which one first started to work in the earnings equation closely parallels the experience variable in standard Mincer models, where the proxy for experience is the age at which one first started to work subtracted from his or her current age (Emerson and Souza, 2011). Therefore, we only changed the specification of the classical model by using the two variables separately and other usual control variables. For this reason, our estimates should not be disqualified only because we could not use robust instrumental variables for level of schooling and age of entry into the labor market. But, we recognize that our inferences of causality are also only suggestive and tentative.

Acknowledgements

The comments and suggestions provided by Rodolfo Hoffmann and the anonymous reviewers were extremely valuable in revising an earlier version of this paper. Any remaining errors and omissions are our full responsibility.

Appendix A.

See Tables A.1–A.3

Table A.1
Earnings equations (models A and B) using Heckman's procedure for Brazilian individuals aged from 23 to 65 years old, by level of education and gender.

Logarithm of hourly earnings	Model A				Model B			
	High school		Higher education		High school		Higher education	
	Woman	Man	Woman	Man	Woman	Man	Woman	Man
Constant	0.175*	0.108*	0.843*	0.753*	0.183*	0.121*	0.916*	0.842*
	(0.0348)	(0.0310)	(0.0594)	(0.0747)	(0.0347)	(0.0309)	(0.0592)	(0.0746)
Age	0.0517*	0.0697*	0.0575*	0.0676*	0.0520*	0.0697*	0.0604*	0.0706*
	(0.00180)	(0.00156)	(0.00290)	(0.00332)	(0.00179)	(0.00156)	(0.00291)	(0.00331)
Age squared	−0.000410*	−0.000608*	−0.000507*	−0.000543*	−0.000409*	−0.000605*	−0.000541*	−0.000573*
	(0.0000239)	(0.0000207)	(0.0000368)	(0.0000406)	(0.0000238)	(0.0000206)	(0.0000369)	(0.0000404)
Mulatto	−0.132*	−0.187*	−0.0559	−0.273*	−0.121*	−0.181*	−0.0326	−0.267*
	(0.0374)	(0.0441)	(0.0759)	(0.0975)	(0.0371)	(0.0437)	(0.0763)	(0.0960)
Black	−0.172*	−0.175*	−0.197*	−0.238*	−0.172*	−0.172*	−0.188*	−0.225*
	(0.00481)	(0.00437)	(0.00858)	(0.0109)	(0.00482)	(0.00435)	(0.00850)	(0.0109)
Yellow	0.107*	0.169*	0.132*	0.0420	0.109*	0.173*	0.127*	0.0393
	(0.0369)	(0.0301)	(0.0329)	(0.0359)	(0.0371)	(0.0299)	(0.0327)	(0.0353)
Indigenous	−0.179*	−0.206*	−0.200*	−0.325*	−0.199*	−0.200*	−0.192*	−0.310*
	(0.00717)	(0.00686)	(0.0161)	(0.0224)	(0.00766)	(0.00687)	(0.0166)	(0.0224)
Urban area	0.107*	0.267*	0.294*	0.502·ym*	0.0875*	0.247*	0.265*	0.467*
	(0.0105)	(0.0115)	(0.0186)	(0.0339)	(0.0104)	(0.0112)	(0.0184)	(0.0332)
Labor union	0.256*	0.201*	0.204*	0.212*	0.256*	0.201*	0.206*	0.207*
	(0.00515)	(0.00450)	(0.00657)	(0.00823)	(0.00512)	(0.00448)	(0.00656)	(0.00819)
Child labor	−0.129*	−0.0776*	−0.215*	−0.234*				
	(0.00415)	(0.00405)	(0.00770)	(0.00878)				
Age started to work: 8 or less					−0.272*	−0.189*	−0.511*	−0.575*
					(0.0108)	(0.00877)	(0.0252)	(0.0257)
9–10					−0.249*	−0.161*	−0.458*	−0.507*
					(0.00869)	(0.00741)	(0.0199)	(0.0230)
11–12					−0.173*	−0.0917*	−0.394*	−0.402*
					(0.00725)	(0.00647)	(0.0174)	(0.0198)
13–14					−0.0804*	−0.0258*	−0.267*	−0.307*
					(0.00570)	(0.00542)	(0.0138)	(0.0156)
15–16					−0.0458*	−0.0330*	−0.232*	−0.277*
					(0.00494)	(0.00499)	(0.0118)	(0.0153)
17–18							−0.159*	−0.179*
							(0.0106)	(0.0142)
19–20							−0.104*	−0.109*
							(0.0117)	(0.0163)
21–22							−0.0207***	−0.0117
							(0.0126)	(0.0188)
ath $\hat{\rho}$	0.921*	−0.209*	0.890*	−0.345*	0.927*	−0.211*	0.878*	−0.342*
	(0.0235)	(0.00870)	(0.0447)	(0.0298)	(0.0236)	(0.00879)	(0.0444)	(0.0297)
Number of obs.	186,083	219,149	75,395	58,147	186,083	219,149	75,395	58,147

Notes: Linearized standard errors in parentheses; Four dummy variables to distinguish between the five Brazilian regions, and nine dummy variables to distinguish 10 years were used; The selection equation estimates are available upon request.

* Significance at 1% respectively.

*** Significance at 10% respectively.

Table A.2
Earnings equations (models A and B) using Heckman's procedure for Brazilian males aged from 23 to 65 years old.

Variables	Age started to work								
	8 or less	9–10	11–12	13–14	14–16	17–18	19–20	21–22	23 or more
Constant	−0.428*	−0.284*	−0.336*	−0.404*	−0.426*	−0.381*	−0.525*	−0.941*	−1.029*
	(0.0450)	(0.0391)	(0.0367)	(0.0355)	(0.0349)	(0.0415)	(0.0721)	(0.129)	(0.131)
Age	0.0492*	0.0451*	0.0483*	0.0565*	0.0577*	0.0601*	0.0662*	0.0846*	0.0843*
	(0.00204)	(0.00180)	(0.00176)	(0.00171)	(0.00166)	(0.00199)	(0.00341)	(0.00617)	(0.00577)
Age squared	−0.000488*	−0.000436*	−0.000454*	−0.000525*	−0.000523*	−0.000523*	−0.000583*	−0.000770*	−0.000743*
	(0.0000239)	(0.0000216)	(0.0000218)	(0.0000214)	(0.0000210)	(0.0000255)	(0.0000436)	(0.0000792)	(0.0000699)
Mulatto	−0.0826	−0.109	−0.143*	−0.189*	−0.120*	−0.0161	−0.154***	−0.530**	0.187
	(0.0542)	(0.0676)	(0.0443)	(0.0487)	(0.0401)	(0.0550)	(0.0866)	(0.259)	(0.146)
Black	−0.128*	−0.127*	−0.146*	−0.154*	−0.152*	−0.137*	−0.145*	−0.167*	−0.157*
	(0.00676)	(0.00652)	(0.00567)	(0.00528)	(0.00504)	(0.00579)	(0.00987)	(0.0169)	(0.0179)
Yellow	0.132**	0.106**	0.176*	0.146*	0.0755**	0.0369	0.0627	0.136	0.114***
	(0.0554)	(0.0468)	(0.0502)	(0.0423)	(0.0383)	(0.0470)	(0.0682)	(0.104)	(0.0627)
Indigenous	−0.128*	−0.130*	−0.167*	−0.186*	−0.173*	−0.175*	−0.195*	−0.156*	−0.200*
	(0.0119)	(0.00997)	(0.00910)	(0.00794)	(0.00825)	(0.00916)	(0.0160)	(0.0305)	(0.0318)
Years of schooling	0.0660*	0.0663*	0.0663*	0.0626*	0.0604*	0.0538*	0.0523*	0.0476*	0.0468*
	(0.00110)	(0.00103)	(0.000958)	(0.000901)	(0.000939)	(0.00110)	(0.00198)	(0.00354)	(0.00377)
S^{λ}	0.0918*	0.101*	0.111*	0.129*	0.140*	0.174*	0.193*	0.219*	0.247*
	(0.00530)	(0.00460)	(0.00390)	(0.00293)	(0.00301)	(0.00299)	(0.00454)	(0.00678)	(0.00729)
Urban area	0.342*	0.317*	0.300*	0.267*	0.242*	0.165*	0.163*	0.178*	0.157*
	(0.00935)	(0.00834)	(0.00844)	(0.00957)	(0.0106)	(0.0140)	(0.0246)	(0.0405)	(0.0439)
Labor union	0.0861*	0.0873*	0.116*	0.171*	0.171*	0.175*	0.203*	0.225*	0.210*
	(0.00824)	(0.00819)	(0.00708)	(0.00571)	(0.00575)	(0.00625)	(0.0106)	(0.0168)	(0.0168)
ath $\hat{\rho}$	−0.278*	−0.305*	−0.231*	−0.204*	−0.266*	−0.238*	−0.325*	−0.394*	−0.379*
	(0.0210)	(0.0194)	(0.0156)	(0.0124)	(0.0122)	(0.0126)	(0.0294)	(0.0424)	(0.0505)
Number of obs.	86,397	116,150	110,128	130,787	135,131	107,508	37,584	13,618	15,188

Notes: Linearized standard errors in parentheses; Four dummy variables to distinguish between the five Brazilian regions, and nine dummy variables to distinguish ten years were used; The selection equation estimates are available upon request.

* Significance at 1% respectively.

** Significance at 5% respectively.

*** Significance at 10% respectively.

Table A.3
Earnings equations (models A and B) using Heckman's procedure for Brazilian women aged from 23 to 65 years old.

Variables	Age started to work								
	8 or less	9–10	11–12	13–14	14–16	17–18	19–20	21–22	23 or more
Constant	−0.341*	−0.203*	−0.0480	−0.115**	−0.556*	−0.706*	−0.962*	−0.880*	−0.111
	(0.0873)	(0.0645)	(0.0622)	(0.0520)	(0.0483)	(0.0499)	(0.0702)	(0.102)	(0.0787)
Age	0.0362*	0.0311*	0.0287*	0.0364*	0.0493*	0.0573*	0.0651*	0.0678*	0.0380*
	(0.00391)	(0.00293)	(0.00282)	(0.00233)	(0.00223)	(0.00234)	(0.00334)	(0.00485)	(0.00360)
Age squared	−0.000323*	−0.000258*	−0.000232*	−0.000317*	−0.000432*	−0.000498*	−0.000575*	−0.000592*	−0.000277*
	(0.0000458)	(0.0000349)	(0.0000340)	(0.0000287)	(0.0000282)	(0.0000303)	(0.0000431)	(0.0000631)	(0.0000439)
Mulatto	0.0184	0.0122	−0.0173	−0.0208	−0.154*	−0.196*	0.00871	−0.0289	−0.128***
	(0.0767)	(0.0720)	(0.0664)	(0.0555)	(0.0470)	(0.0461)	(0.0675)	(0.120)	(0.0752)
Black	−0.101*	−0.0953*	−0.119*	−0.125*	−0.143*	−0.140*	−0.117*	−0.173*	−0.132*
	(0.0107)	(0.00852)	(0.00785)	(0.00674)	(0.00612)	(0.00656)	(0.00891)	(0.0139)	(0.00984)
Yellow	0.116	0.0901	0.146**	0.0955***	0.101*	0.0605	0.0542	0.144**	0.204*
	(0.0752)	(0.0761)	(0.0635)	(0.0527)	(0.0385)	(0.0438)	(0.0529)	(0.0585)	(0.0611)
Indigenous	−0.100*	−0.0621*	−0.110*	−0.139*	−0.131*	−0.156*	−0.134*	−0.157*	−0.159*
	(0.0170)	(0.0145)	(0.0123)	(0.0103)	(0.0102)	(0.0105)	(0.0146)	(0.0250)	(0.0174)
Years of schooling	0.0513*	0.0518*	0.0500*	0.0480*	0.0545*	0.0585*	0.0583*	0.0531*	0.0358*
	(0.00183)	(0.00156)	(0.00145)	(0.00120)	(0.00118)	(0.00148)	(0.00203)	(0.00338)	(0.00201)
S^{λ}	0.117*	0.125*	0.124*	0.148*	0.147*	0.154*	0.172*	0.200*	0.237*
	(0.00631)	(0.00502)	(0.00445)	(0.00321)	(0.00276)	(0.00284)	(0.00389)	(0.00571)	(0.00416)
Urban	0.196*	0.188*	0.180*	0.153*	0.165*	0.108*	0.145*	0.0261	0.0723*
	(0.0154)	(0.0143)	(0.0140)	(0.0135)	(0.0145)	(0.0157)	(0.0227)	(0.0327)	(0.0220)
Labor union	0.120*	0.0978*	0.147*	0.195*	0.212*	0.205*	0.222*	0.210*	0.214*
	(0.0145)	(0.0130)	(0.0117)	(0.00822)	(0.00722)	(0.00653)	(0.00918)	(0.0131)	(0.0110)
ath $\hat{\rho}$	−0.175*	−0.170*	−0.172*	−0.0806**	0.673*	0.895*	0.885*	0.893*	−0.204*
	(0.0466)	(0.0351)	(0.0385)	(0.0394)	(0.0448)	(0.0372)	(0.0346)	(0.0415)	(0.0355)
Number of obs.	36,143	54,066	57,456	75,367	93,253	93,070	46,604	21,412	41,810

Notes: Linearized standard errors in parentheses; Four dummy variables to distinguish between the five Brazilian regions, and nine dummy variables to distinguish ten years were used; The selection equation estimates are available upon request.

* Significance at 1% respectively.

** Significance at 5% respectively.

*** Significance at 10% respectively.

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